

## 5. POTENTIAL FOR HUMAN EXPOSURE

Other conditions that increase Pb mobility in soils are reducing conditions (low redox potential; for example, anoxia) and high chloride content.

Pb is dispersed throughout the environment primarily as the result of anthropogenic activities. In the air, Pb is in the form of particles and is removed by rain or gravitational settling. The solubility of Pb compounds in water is a function of pH, ionic strength, and the presence of humic material. Solubility is highest in acidic water. Soil and sediment are an important sink for Pb. Because Pb is strongly adsorbed to soil, very little is transported through runoff to surface water or leached to groundwater except under acidic conditions. Anthropogenic sources of Pb include the mining and smelting of ore, manufacture and use of Pb-containing products, combustion of coal and oil, and waste incineration. Many anthropogenic sources of Pb, most notably leaded gasoline, Pb-based paint, Pb solder in food cans, Pb-arsenate pesticides, and shot and sinkers, have been eliminated or are regulated. Pb compounds released to the environment may be transformed to other Pb compounds; however, Pb is an element and cannot be destroyed or degraded. Because Pb does not degrade over time, deposits of Pb in the environment by current and former uses leave their legacy as higher concentrations of Pb in the environment. These deposits can continue to be a source for potential Pb exposure (e.g., soil particles containing Pb also may be resuspended and redeposited). Plants and animals may bioconcentrate Pb, but Pb is not biomagnified in the aquatic or terrestrial food chain.

The general population may be exposed to Pb in ambient air, foods, drinking water, soil, and dust. Segments of the general population at highest risk of health effects from Pb exposure are preschool-age children and pregnant women and their fetuses. Other segments of the general population with an increased exposure include individuals living near sites where Pb was produced or disposed. Some of the more important Pb exposures have occurred as a result of living in urban environments, particularly in areas near stationary emission sources (e.g., smelters); renovation of homes containing Pb-based paint; pica (the compulsive, habitual consumption of nonfood items); contact with interior Pb paint dust; occupational exposure; and secondary occupational exposure (e.g., families of workers in Pb industries). Higher exposures may also occur to residents living in close proximity to NPL sites that contain elevated levels of Pb.

The primary source of Pb in the environment has historically been anthropogenic emissions to the atmosphere. In 1984, combustion of leaded gasoline was responsible for approximately 90% of all anthropogenic Pb emissions. The United States gradually phased out the use of Pb alkyls in gasoline, and by 1990, auto emissions accounted for only 33% of the annual Pb emissions (EPA 1996b). Use of Pb